

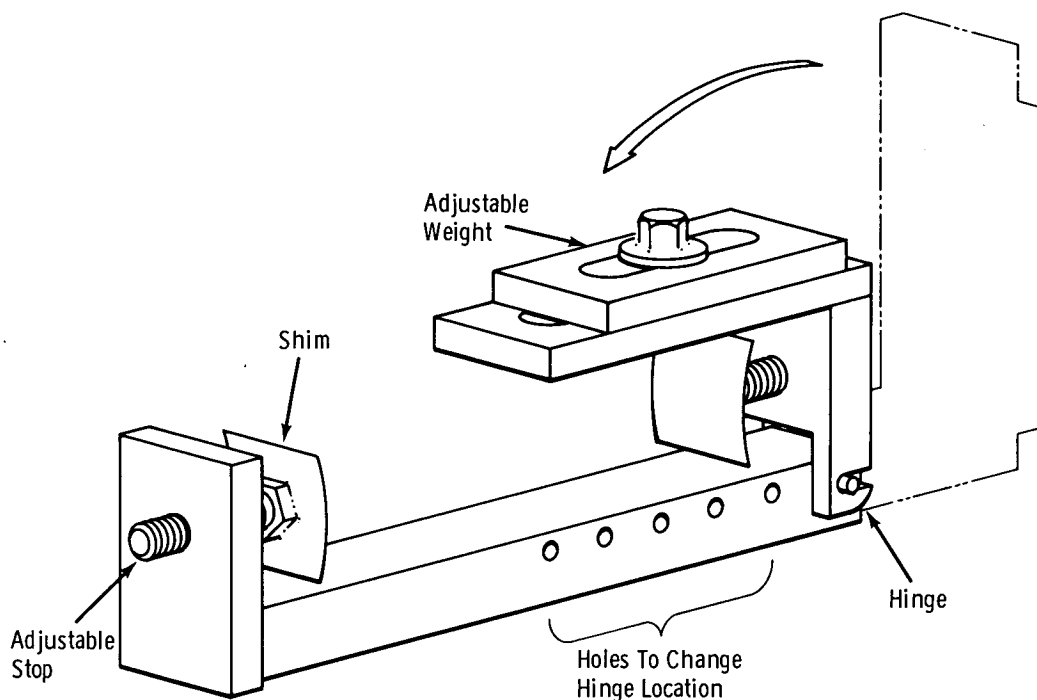
NASA TECH BRIEF

Lewis Research Center



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

Self-Adjusting Assembly Jig



The Problem:

Design an assembly jig for holding parts to be bonded together in alignment and under constant pressure while subjected to thermal expansion and contraction, as in furnace brazing.

Furnace brazing is well-suited for bonding together parts having multiple and/or inaccessible joints, for bonding thin sections to thick sections, and for joining parts made of dissimilar metals. The surfaces to be bonded must fit closely together, usually within 0.10 to 0.13 mm (0.004 to 0.005 inch). Parts must be held firmly together and in alignment, and brazing sheet or foil must be held in contact with the joint surfaces during the brazing operation. Jigs, fixtures, blocks and weights are commonly used to hold the parts in place. However, these holding devices often do not accommodate thermal expansion and contraction, resulting in misaligned, deformed or incomplete

joints, and/or broken fixtures. Also, conventional holding devices must often be tailored to each job, and their bulk often constitutes an undesirable heat sink which lengthens the time required for the brazing operation.

The Solution:

A lightweight jig which self-adjusts for thermal expansion and contraction to hold the parts being joined under constant pressure and in correct alignment during the entire joining operation.

How It's Done:

As shown in the figure, the jig consists of a flat bed with one fixed end and one adjustable hinged end. The hinged end is adjustable both at the hinge and at the weighted beam. The weighted beam and beam arm are slotted to permit sliding adjustment. The hinge pin may

(continued overleaf)

be removed and relocated along the flat bed to compensate for the size of the parts. Thus the hinged end, together with the adjustable shims, provide an adjustable clamping force for holding together the parts to be joined. The hinged end pivots to automatically compensate for thermal expansion and contraction while maintaining a constant force on the parts.

The jig is simple and easy to use, durable and maintenance free. It can be used to join parts of many sizes and shapes, by several joining methods.

Parts and joints are readily visible and accessible. In furnace brazing, this accessibility allows optimum placement of thermocouples which is important in experimental work where time and temperature parameters must be established.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B73-10250

Patent Status:

NASA has decided not to apply for a patent.

Source: Michael J. Haaser
Lewis Research Center
(LEW-12034)